NITROGEN FERTILIZATION IMPACTS ON YIELD OF MAIZE INBRED LINES

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The study was carried out in the experimental filed of the Maize Research Institute, Zemun Polje, on calcareous chernozem in the period 2001-2003. The traits of two maize inbred lines (L1 - FAO 400 and L2 - FAO 600) were observed in dependence on the time of the nitrogen application (N_0 - control without fertilising; N_{autumn} - 60 kg P_2O_5 ha^{-1} and 60 kg K_2O ha^{-1} applied in autumn (const.) + 100 kg N ha^{-1} (applied in autumn); N_{spring} - PK (const.) + 100 kg N ha^{-1} (applied in spring); $N_{1/2}$ - PK (const.) + 100 kg N ha^{-1} (half of which was applied in autumn and the other half in spring); $N_{1/3}$ - PK (const.) + 100 kg N ha^{-1} (1/3 of which was applied in autumn, 1/3 in spring and 1/3 through soil dressing); N_{min} - PK (const.) + fertilising in spring on the basis of the Nmin method, and forms of applied nitrogen: Urea (amide form), KAN (ammonium-nitrate form) and $(NH_4)_2SO_4$ (ammonium form).
he highest average yield was obtained by the use of Nmin method (3,486 kg ha^{-1}), as well as, 100 kg N ha^{-1} applied in spring (N_{spring}) (3,337 kg ha^{-1}), 100 kg N ha^{-1} applied in autumn and spring ($N_{1/2}$) (3,020 $kgha^{-1}$) and 100 kg N ha^{-1} applied in autumn, spring and soil dressing ($N_{1/3}$) (3,005 kg ha^{-1}) in the ammonium-nitrate form (KAN). The highest average grain yield of observed maize inbred lines (3,264 kg ha^{-1}) was obtained by the application of ammonium-sulphate in the primary tillage (N_{autumn}). The use of the Nmin method (N ranging from 17 to 35 kg ha^{-1}, in dependence on the soil mineral nitrogen content), especially in years with lower precipitation sums, resulted in the highest increase in grain yield (39.2%) of observed maize inbred lines in relation to the control.

Key words: nitrogen, time of nitrogen application, nitrogen form, maize inbred lines, grain yield

Istraživanja su obavljena na oglednom polju Instituta za kukuruz "Zemun Polje", 2001., 2002. i 2003. godine, na zemljištu tipa karbonatni černozem. U radu su ispitivane osobine dve inbred linije kukuruza (L1 – FAO 400 i L2 – FAO 600) u zavisnosti od vremena primene azota (N_0 - Kontrola bez primene đubriva; N_{jesen} - 60 kgP_2O_5 ha^{-1} i 60 kgK_2O ha^{-1} primenjeni u jesen (const.) + N-100 $kgha^{-1}$ (primenjen u jesen); $N_{proleće}$ - PK (const.) + N-100 $kgha^{-1}$ (primenjen u proleće); $N_{1/2}$ - PK (const.) + N-100 $kgha^{-1}$ (primenjen 1/2 u jesen i 1/2 u proleće); $N_{1/3}$ - PK (const.) + N-100 $kgha^{-1}$ (primenjen 1/3 u jesen, 1/3 u proleće i 1/3 u prihrani); N_{min} - PK (const.) + đubrenje u proleće na bazi N-min metode, i oblika primenjenog azota: urea (amidni oblik), KAN (amonijum-nitratni oblik) i $(NH_4)_2SO_4$ (amonijum oblik). Najveći prosečan prinos semena ostvaren je primenom Nmin metode (3486 $kgha^{-1}$), kao i 100 kgN ha^{-1} u proleće ($N_{proleće}$) (3337 $kgha^{-1}$), 100 kgN ha^{-1} u jesen i proleće ($N_{1/2}$) (3020 $kgha^{-1}$) i 100 kgN ha^{-1} u jesen, proleće i u prihrani ($N_{1/3}$) (3005 $kgha^{-1}$) u amonijum-nitratnom obliku (KAN). Primenom amonijum-sulfata u osnovnoj obradi (N_{jesen}) ostvaren je najveći prosečan prinos semena ispitivanih inbred linija kukuruza (3264 $kgha^{-1}$). Đubrenje azotom na bazi N-min metode (17-35 kgN ha^{-1} u zavisnosti od sadržaja mineralnog azota u zemljištu), naročito u godinama sa manjom količinom padavina, rezultovalo je povećanjem prinosa zrna (39.2%) inbred linija kukuruza u odnosu na kontrolu.